Claims:

1. A photocatalytic composite material comprising a mass of inorganic fibers characterized in that the surfaces of the individual fibers are coated with a continuous film of a photocatalyst comprising titanium oxide.

2. A photocatalytic composite material as set forth in claim 1 wherein the continuous film is a film formed by vapor deposition.

3. A photocatalytic composite material as set forth in claim 1 or 2 wherein the inorganic fibers are glass fibers.

4. A photocatalytic composite material as set forth in claim 1 or 2 wherein the mass of fibers is in the form of yarn, woven fabric, nonwoven fabric, or wool.

5. A photocatalytic composite material comprising a substrate having an inorganic surface characterized in that at least part of the inorganic surface is coated with a continuous film of a photocatalyst comprising crystalline titanium oxide with an average crystallite diameter of 50 nm or smaller which is formed by vapor deposition.

6. A photocatalytic composite material as set forth in claim 2 or 5 wherein the vapor deposition is performed with titanium tetrachloride.

7. A photocatalytic composite material as set forth in claim 1 or 5 wherein the photocatalyst consists essentially of titanum oxide.

8. A photocatalytic composite material as set forth in claim 1 or 5 wherein the photocatalyst further comprises at least one of silicon oxide, zinc oxide, zirconium oxide, and aluminum oxide, in addition to titanium oxide.

9. A photocatalytic composite material as set forth in claim 1 or 5 wherein the photocatalyst is doped with a transition metal oxide.

10. A photocatalytic composite material as set forth in claim 1 or 5 wherein the substrate or the photocatalytic continuous film is colored.

11. A process for producing a photocatalytic composite material as set forth in claim 1, the process being characterized in that it comprises a vapor deposition step in which a mass of inorganic fibers which has been heated at a temperature of 100 - 300 °C is brought into contact with titanium tetrachloride vapor and water vapor to form a film comprising a titanium oxide precursor on the surfaces of the individual fibers, and a heating step in which the fibrous mass is heated in an oxidizing atmosphere to convert the precursor film into a continuous film of a photocatalyst comprising titanium oxide.

12. A process as set forth in claim 11 wherein the heating temperature in the heating step is 250 - 800°C.

13. A process as set forth in claim 12 wherein the heating temperature in the heating step is 300 - 600°C.

14. A process for producing a photocatalytic composite material as set forth in claim 5, the process being characterized in that it comprises a vapor deposition step in which a substrate having an inorganic surface which has been heated at a temperature of 100 - 300 °C is treated such that at least part of the inorganic surface is brought into contact with titanium tetrachloride vapor and water vapor to form a film comprising a titanium oxide precursor on the surface, and a heating step in which the substrate is heated in an oxidizing atmosphere at a temperature of 300 - 600 °C to convert the precursor film into a continuous film of a photocatalyst comprising crystalline titanium oxide having an average crystallite diameter of 50 nm or smaller.

15. A process as set forth in claim 11 or 14 wherein in the vapor deposition step, the titanium tetrachloride vapor and water vapor are previously mixed before contact with the mass of fibers or with the substrate surface.

16. A process as set forth in claim 11 or 14 wherein the titanium tetrachloride vapor is purified by distillation.

17. A process as set forth in claim 11 or 14 wherein the proportions of the titanium tetrachloride vapor and the water vapor used in the vapor deposition step are such that the $H_2O/TiCl_4$ molar ratio is in the range of 0.05 - 4.

18. A process as set forth in claim 11 or 14 wherein each of the titanium tetrachloride vapor and the water vapor is diluted with a dry air or an inert gas to a concentration of 0.1 - 10%.

19. A process as set forth in claim 11 or 14 wherein the titanium tetrachloride vapor contains vapor of a compound of at least one element selected from silicon, zinc, zirconium, and aluminum.

20. A process as set forth in claim 11 or 14 wherein the titanium tetrachloride vapor contains vapor of at least one transition metal compound selected from halides and oxyhalides.

21. A process as set forth in claim 11 or 14 wherein the amount of film formation for each operation in the vapor deposition step in terms of the film thickness is at most 500 nm.

22. A process as set forth in claim 21 wherein the vapor deposition step and the heating step are repeated one or more times.

23. A process as set forth in claim 11 or 14 which further includes a step of

removing acidic gases and/or titanium compounds generated in the vapor deposition step and/or in the heating step.

24. A process as set forth in claim 11 or 14 wherein the mass of fibers or the substrate is previously colored with a coloring pigment prior to the vapor deposition step.

25. A process as set forth in claim 11 or 14 which further includes a coloring step with an inorganic pigment subsequent to the heating step.

26. A fibrous product having environmental depollution effects comprising a photocatalytic composite material as set forth in any of claims 1 - 4 and claims 6 - 10 in which the substrate is a mass of fibers.

27. A product having environmental depollution effects comprising a photocatalytic composite material as set forth in any of claims 5 - 10.